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## PATENT ABSTRACTS OF JAPAN

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## (54) WARM HEAT STICKING AGENT

## (57)Abstract:

PURPOSE: To obtain a warm heat sticking agent and exothermic member tacky adhesive agent which have excellent thermal conductive and tacky adhesive characteristics, absorbs secretions such as sweat and are stable to heat by using a tacky adhesive agent consisting of an A-B-A type block copolymer, alicyclic petroleum resin, softener, and a water absorptive high polymer.

CONSTITUTION: The A-B-A type block copolymer refers to a block copolymer of a monovinyl subst. arom. compd. A and conjugate diolefin copolymer B and the compounding ratio thereof is specified to 10-30 pts.wt. in the tacky adhesive agent compsn. The water absorptive polymer refers to the polymer which gelatinizes and swells by absorbing water of 10 times its own weight and is prepd. by properly mixing 1 or 2 kinds of the water absorptive polymers introduced with a light crosslinking bond with, for example, a water soluble polymer. The ratio of said polymer to be compounded is 1-10 pts.wt. in the tacky adhesive agent compsn. The alicyclic petroleum resin refers to a petroleum resin having cyclic skeleton and the ratio of said resin to be compounded is 10-50 pts.wt. Higher fatty acid, liquefied rubber, mineral oil, etc., are used for the softener and the ratio of the softener to be compounded is 10-50 pts.wt. The warm heat sticking agent is obtd. by combining this tacky adhesive agent with the exothermic member.

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1. Title of the invention

Warm heat sticking agent

2. Claims

1. The warm heat sticking agent which gave a tacky adhesive agent comprising the following to a exothermic member;

A - B - A type block copolymer, alicyclic petroleum resin, softener and water absorptive high polymer.

2. The warm heat sticking agent which gave a tacky adhesive agent comprising the following to a exothermic member;

A - B - A type block copolymer 10-30 part by weight, alicyclic petroleum resin 10-50 part by weight, softener 10-50 part by weight and water absorptive high polymer 1-10 part by weight.

3. A tacky adhesive agent for exothermic members comprising;

A - B - A type block copolymer, alicyclic petroleum resin, softener and water absorptive high polymer.

4. A tacky adhesive agent for exothermic members comprising;

A - B - A type block copolymer 10-30 part by weight, alicyclic petroleum resin 10-50 part by weight, softener 10-50 part by weight and water absorptive high polymer 1-10 part by weight.

5. The warm heat sticking agent which gave the tacky adhesive agent which contained the following to a exothermic member;

A - B - A type block copolymer, alicyclic petroleum resin, softener, water absorptive high polymer and a drug.

3. Detailed description of the invention

[Field of industrial application]

It is to provide evolution of warm heat sticking agent and tacky adhesive agent for exothermic member in superior range of autohesion aimed at applying to human body skin.

[Prior art]

Conventionally, warm heat sticking agent comprising exothermic layer running hot by means of existence of air or oxygen and blocking layer is examined.

For example, hot compress frame comprising exothermic member consisting of iron powder or the like and compress member Japanese Patent Laid-Open No. 50-54188 is disclosed.

The hyperthermia fomentation comprising exothermic agent consisting of a sulfide of alkali metal and fomentation in Japanese Patent Laid-Open No. 53-47154, the hyperthermia plaster which put exothermic body and binder together in Japanese Patent Laid-Open No. 62-103014 issue more are disclosed respectively.

[Problem to be solved by the invention]

However, in these hyperthermia patch,

A)

Because the adhesive strength is weak, when it is affixed to skin, supporting means to stop with adhesive tape is requirement.

B)

In the shadow of water to contain in fomentation, heat conduction is bad, and there are a feeling cold and ragtime before feeling cold and warm sensation in pasting.

C)

There is the case of catching on by cuticle abrasion with the use of oily binder.

D)

Secretion of perspiration by pyrexia is pooled between fomentation and skin, which causes catching on.

E)

A change gets up in binder coming in contact with skin by pyrexia, there is the case that ointment body are disturbed.

There is the above-mentioned problem, it is the present conditions that ideal warm heat sticking agent and evolution of tacky adhesive agent for exothermic member do not yet appear.

Thus as a result that the present inventors repeated a study zealously in order to solve these problems, by employing the tacky adhesive agent comprising A - B - A type block copolymer, alicyclic petroleum resin, softener and water

absorptive high polymer,

1. Containment of heat conduction nature for feeling warm sensation since pasting time

2. The flexible adherence characteristic that can follow movement of skin

3. Absorption of secretion of the perspiration which causes catching on

4. It is stable as against heat, and ointment body are not disturbed

5. Relaxation of a side effect as opposed to skin (catching on)

That it is in evolution of in the right ideal warm heat sticking agent and tacky adhesive agent for exothermic member which holds characteristics of above is found, the present invention was finished.

[Means to solve the problems]

The present invention finds the most suitable binder for warm heat sticking agent and tacky adhesive agent for exothermic members, and provides warm heat sticking agent.

Component of the present invention is explained in detail next.

A - B - A type block copolymer is block copolymer with monovinyl displacement aromatic compound A and conjugation diolefin copolymer B, and specifically, calif lek TR -1101, calif lek TR -1107, calif lek TR -1111 (made by shell chemistry), SOLPLENE the 418 (made by Philip Petroleum) or the like, and the combination quantity is 10-30 part by weight in binder composition, and preferably it is 15-25 part by weight.

With water absorptive high polymer, water more than 10 times of own weight is absorbed and gelation swelling, and the water absorptive high polymer which, for example, introduced slight cross linking into water soluble polymer has it in appropriately solely or two kinds of blending of and over, and it is prescribed.

Concretely, sun wet IM -300, sun wet IM -300 MPS, sun wet IM -1000, sun wet IM -1000 MPS (made in Sanyo Kasei), aqua keeping 4 S, aqua keeping 4 S H (made by iron manufacture chemistry), SUMIKAGEL S P-520, SUMIKAGEL N -1040 (made by Sumitomo chemistry), K I gel 201 - K, K I gel -201 K - F 2 (made in Kuraray), ARASORB 800, ARASORB 800 F (made by Arakawa chemistry), in particular, sun wet IM -300 M P S, sun wet IM -1000 MPS, SUMIKAGEL N P -1020, SUMIKAGEL N P -1040, K I gel -201 K - F 2, ARASORB 800 F, are preferred.

As a quantity of combination, it is 1-10 part by weight in binder composition, and preferably it is 2-8 part by weight.

Alicyclic petroleum resin is the oil resin which had cyclic skeleton, specifically,

ALKON P -85, ALKON P -100, ALKON P -125 (made by Arakawa chemistry), Quinn tonne (made by Nippon Zeon), ESCOREZ 3000 concretely (made in Exxon), and the combination quantity is 10-50 part by weight, and preferably it is 25-45 part by weight.

As softener, higher fatty acid, colliquation gum, mineral oil are used as a quantity of the combination, 10-50 part by weight, and preferably 25-45 part by weight.

Depending on other purpose of use, it is combined optimum dose of age resistor, inorganic filler, oxidation inhibitor of publicly known appropriately conventionally.

The provided binder as above is put together with a exothermic member, and warm heat sticking agent of the present invention is given. There is not limitation in exothermic member, and if the exothermic member has evolution of heat of publicly known conventionally here, all can be applied.

For example, exothermic member of the electric use, of a dry cell or solar battery use, or paper-shaped battery, or moxa and or body warmer member used since early times, and pyrexia body member that used pyrexia of chemistry or the like is given.

In addition, for example, as raw materials of pyrexia body warmer that used pyrexia of chemistry, a defined thing is employed by a Japanese Patent Laid-Open No. 50-105562 bulletin, a Japanese Utility Model Laid-Open No. 50-97289 issue bulletin, a Japanese Patent Laid-Open No. 50-23064 issue bulletin, a Japanese Patent Laid-Open No. 50-40477 issue bulletin, a Japanese Utility Model Laid-Open No. 55-59616 issue bulletin, a Japanese Patent Publication No. 60-12381 issue bulletin, a Japanese Patent Publication No. 61-8116 issue bulletin, a Japanese Patent Publication No. 63-24030 issue bulletin, but, restriction is not done by a thing as claimed in these quotation bulletin, naturally a bulletin aside from these or a thing as claimed in literature is employed, too.

In addition, as for the preferred exothermic member of the present invention, a pyrexia body warmer that uses pyrexia of chemistry is more convenient in its portability.

As the composition, iron powder system, reaction auxiliary, water and humectant are given, and the substance that occurs heat in coexistent of air and aqua with a thing consisting of humectant are employed willingly.

Specifically, it is the composition which combination prescribed pyrogen charges such as iron powder, reduced iron powder, activated carbon, alumina, silica gel, charcoal, water absorptive high polymer, sodium chloride, potassium chloride,

magnesium chloride, iron chloride, acetic acid, chloroacetic acid, aqua, acrylic system water absorptive high polymer for appropriately, and about 1-2g/cm<sup>2</sup> is suitable for exothermic agent quantity employing in the present invention.

In addition, it is the most important not to damage bear homeostasis of the binder layer as a temperature condition of exothermic agent, and high temperature condition of extreme is unfavorable.

Thus less than 60 degrees Celsius are preferable binder skin temperature as temperature setting of the present invention, and preferably less than 50 degrees Celsius, and less than 45 degrees Celsius are the most preferable.

In addition, when a far infrared radiation effect is expected, ceramics can be included in a exothermic composition, or a layer incorporated of ceramics can be set between exothermic layer and binder layer.

In this way provided warm heat sticking agent is employed by affection such as shoulder discomfort, backache, a bruise, sprain, and could expect therapy effect by hyperthermia enough. Further, it made control in particular development of catching on problem in use remarkably by having warm heat sticking agent of the present invention bring perspiration absorption.

In addition, it makes contain drug percutaneously absorbable, and can be used as patch for hyperthermia medical treatment.

For example,, as skin stimulating agent and analgesia antiphlogistine, in salicylic acid, methyl salicylate, salicylic acid glycol, 1 - menthol, camphor, mentha oil, thymol, nicotinic acid benzyl ester, capsicum extract, capsaicin, nonyl acid ワニアルアミド, felbinac, flufenamic acid butyl, piroxicam, indometacin, ketoprofen, pranoprofen, feprazone, loxoprofen, amfenac sodium, oxaprozin, emorfazone, fenthiozac, diclofenac sodium, diflunisal, ibuprofen piconol, bendazac and suprofen, these ester derivative or buprenorphine hydrochloride, bentazocin, butorphanol tartrate or the like.

As central nerve agent (sleep analgesic, stake epilepsy agent, drug for psycho neurosis), fluphenazine, thioridazine, diazepam, chlorpromazine, nitrazepam, estazolam, triazolam, nimethazepam, flunitrazepam, halosexo, flurazepam, clonazepam, propericiazine, prochlorperazine, alprazolam, oxazepam, oxazolam, cloxazolam, prazepam, flutazolam, mexazolam, lorazepam, fludiazepam, bromazepam, medazepam or the like.

As diuretic drug, hydrocyazide, bendroflunacyazide, ethiazide, cyclopenthiazide, hydrochlorothiazide, penflutizide, methyclothiazide, furosemide, metolazone, polythiazide, bendroflumethiazide or the like.

As antihypertensive agent, clonidine, alseroxylon, rescinnamine, dihydroergotoxinemesylate, recerpine, prazosin, captopril, pindolol, maleic acid enalapril or the like.

As coronary vasodilator, glyceryl trinitrate, nitroglycerol, isosorbide dinitrate, hydrochloric acid papaverine, dipyridamole, efloxate, trimethazine, nicorandil, cinnarizine, ナイリドン, molsidomine, nifedipine or the like.

As antitussive expectorant agent, codeine phosphate, phosphoric acid dihydrocodeine, ephedrine hydrochloride, hydrochloric acid clorprenaline, fenoterol hydrobromide, salbutamol sulfate, dimemorfan phosphate, azelastine hydrochloride, hydrochloric acid clenbuterol, tulobuterol hydrochloride, trimetoquinol hydrochloride, procaterol hydrochloride, hydrochloric acid bromhexin, tranilast, tipepidine hibenazate, fumaric acid ketotifen, formoterol fumarate, phosphoric acid benproperine, glycyrrhetinic acid or the like.

As an antihistamine, diphenhydramine hydrochloride, triprolidine hydrochloride, hydrochloric acid isothipendyl, promethazine-HCl, maleic acid chlorpheniramine, hydrochloric acid cyproheptadine, clemastine fumarate, carbinoxamine maleate, dimetindene maleate or the like.

As agent for arrhythmia, alprenolol, oxprenolol, bucumolol, bupranolol, pindolol, indenolol, carteolol, bufetolol, propranolol, timolol or the like.

As cardiotonic agent, digitalis, ubidecarenone, digoxin, methyl digoxin, deslanoside or the like.

As sex hormone, oestradiol enanthate, oestradiol cypionate, levonorgestrel, estradiol or the like.

As adrenal skin hormone, hydrocortisone acetate, hydrocortisone, prednisolone, triamcinolone acetonide, dexamethasone phosphate, methylprednisolone, acetic acid ダイクロリンアセトニド, acetic acid dexamethasone, dexamethasone, fluorometholone, betamethasone sodium phosphate, betamethasone, betamethasone valerate, propionic acid beclomethasone, fludroxycortide, hydrocortisone butyrate, dipropionic acid betamethasone, fluocinonide, propionic acid clobetasol, valeric acid diflucortolone, halcinonide, amcinonide, valeric acid prednisolone or the like.

As local anesthetic, lidocaine, ethyl aminobenzoate, procaine hydrochloride, dibucaine, procaine or the like are given.

One kind of drug efficacy ingredient or, is combined more than two kinds are used.



The quantity of combination which could expect drug efficacy was preferable, and when the whole binder was done with 100 part by weight, is prescribed in field of 0.001-20 part by weight appropriately.

In addition, naturally extract or powder of the Chinese medicine which can employ as compress medicine, can employ.

In this way, the warm heat sticking agent in which a drug efficacy ingredient was combined with the binder remarkably controls development of catching on by absorbing enough perspiration which causes catching on, even in affixed for a particularly long time.

In addition, there is hyperthermia effect, too, percutaneous absorption of a drug as opposed to human body skin improves remarkably, drug efficacy manifestation nature is desirable in therapy effect fast.

As a manufacturing process, kneading machine such as kneader or a mixer or the like is used by a method of publicly known well conventionally, it is kneaded in temperature of around 120-160 degrees Celsius, and spread on sheet base material, or the blocking sheet base provided by spreading on paper or film with exfoliation treatment once and crimping on the base material for use can be glued together as exothermic body.

It is desirable that warm heat sticking agent produced in this way is processed in hermetic packaging finally, but, it is necessary to take correspondence of the package accepted a way of evolution of heat of exothermic body, it is not the thing which in particular is limited.

[action]

Warm heat sticking agent of the present invention need indispensably, as shown in the following Test examples and Examples,

- 1) A - B - A pattern block copolymer 10-30 part by weight
- 2) water absorptive high polymer 1 to 10 part by weight
- 3) alicyclic petroleum resin 10-50 part by weight
- 4) softener 18-50 part by weight

or, a tacky adhesive agent comprising a composition of 1) to 4) with drug combination, and by combining exothermic body with this, the characteristics such as

- (1) Early warm sensation development
- (2) The flexible adherence characteristic that can follow movement of skin
- (3) Absorption of secretion such as perspiration
- (4) The characteristic that was stable as against heat

(5) Relaxation of a side effect as opposed to skin (catching on) are provided, and it is right ideal warm heat sticking agent and tacky adhesive agent for exothermic member.

[Example]

Next, the above operation/working-effect is explained by Examples and Test examples more in detail.

Example 1

25 part by weight of calif lek T R -1107 (made by shell chemistry) as A - B - A type block copolymer, 30 part by weight of liquid paraffin as softener, and 40 part by weight of ARKON (made by Arakawa chemistry) as alicyclic petroleum resin are kneaded at 160 degrees Celsius in kneader, and 5 part by weight of sun wet IM -300 MPS (made in Sanyo Kasei) as water absorptive high polymer is added and mixed. It is spread on nonwoven fabric in thickness of 350  $\mu$ m cut to desired size and glued to exothermic body, and the warm heat sticking agent of the present invention is provided.

When it was affixed, warm sensation was felt after pasting in three minutes, and moderate warm sensation lasted at the start for six hours.

In addition, there was no skin catching on after abrasion.

Example 2

22 part by weight of calif lek TR -1107 (made by shell chemistry) as A - B - A type block copolymer, 33 part by weight of liquid paraffin as additive, and 37 part by weight of ARKON (made by Arakawa chemistry) as alicyclic petroleum resin are kneaded at 150 degrees Celsius in kneader, 5 part by weight of sun wet IM -300 MPS (made in Sanyo Kasei) as water absorptive high polymer and 3 part by weight of titanium oxide are added and mixed. It was processed same as Example 1, and the warm heat sticking agent of the present invention is provided.

It was affixed to skin and was similar to example 1.

Reference example 1

Gelatine 4 part by weight

Polysodium acrylate 5 part by weight

Glycerine 20 part by weight

Polyvinyl pyrrolidone 1 part by weight

Kaolin 15 part by weight

## Water Balance

By the composition, fomentation is made, it was done same as Example 1, and a warm heat sticking agent is provided.

### Reference example 2

Calif lek TR -1107 20 part by weight

Liquid paraffin 24 part by weight

Hydrogeneration rosin 30 part by weight

Water absorptive high polymer 1 part by weight

By the composition, it was processed same as Example 1, and a warm heat sticking agent is provided.

### Test example 1 (warm sensation test)

Warm heat sticking agents of Example 1 of the present invention and Reference example 1 are affixed to a back of a volunteer, the skin temperature degree change was measured with a temperature sensor.

The result is shown in table 1.

Table 1

#### Time

0 minutes

5 minutes

10 minutes

1 hour

2 hours

3 hours

4 hours

5 hours

#### Sample

Example 1

32.0 degrees Celsius

35.4 degrees Celsius

39.2 degrees Celsius

40.0 degrees Celsius  
 40.1 degrees Celsius  
 40.0 degrees Celsius  
 40.0 degrees Celsius  
 39.8 degrees Celsius  
 Reference example 1  
 32.0 degrees Celsius  
 32.1 degrees Celsius  
 32.4 degrees Celsius  
 36.8 degrees Celsius  
 38.8 degrees Celsius  
 39.6 degrees Celsius  
 39.5 degrees Celsius  
 39.4 degrees Celsius

As shown in Table 1, with warm heat sticking agent of the present invention early warm sensation development is vividly shown in comparison with Reference example. The excellence of warm heat sticking agent and tacky adhesive agent for exothermic member of the present invention is proved.

Test example 2 (a water absorbing power examination)

Each examination sample (Example 1, 2 and Comparative example 1 except exothermic body) 5 X 6 cm is soused in water and taken out eight hours later, the increased weight is divided by the original weight, the quantity which did water absorption is shown in table 2.

(Comparative example 1 is a thing except water absorptive high polymer from Example 1.)

Table 2

Increase by weight %

Example 1 39.7

Example 2 48.5

Comparative example 1 2.1

Test example 3 (a heat-resistant examination)

Fixed extrusion pressure is added with matrix of each Examination sample, exit

velocity of canaliculi in each temperature is measured, it was shown in fig. 2.

As shown in Fig. 1, Example is warm heat sticking agent and tacky adhesive agent for exothermic member to be superior in heat resistance with extremely smaller exit velocity by temperature in comparison with Reference example.

Test example 4 (a flexibility examination)

Hardness and elongation of the examination samples adjusted by 1 model dumbbell were measured at pulling speed of 300 mm/ min, and were shown in fig. 2.

Fig. 2

As shown in Fig. 2, Example 1 is warm heat sticking agent extended in weak force, and superior in elongation, hardness and flexibility after fracture in comparison with Reference example 2.

[Effect of the invention]

As understood from Examples and Test examples, warm heat sticking agent of the present invention of holds the functions such as,

- (1) Early warm development
- (2) The flexible adherence characteristic that can follow movement of skin
- (3) Absorption of secretion such as perspiration
- (4) The characteristic that is stable as against heat
- (5) Relaxation of a side effect as opposed to skin (catching on)

with unprecedented superior autohesion, when a drug is not contained, in particular it is useful as therapeutic agent as opposed to affection such as shoulder discomfort, backache, a bruise, sprain. In addition, if each drug was contained, the above functions are still provided, and each drug efficacy manifestation nature is enhanced and is useful for extremely in pharmaceutical industry.